Fig. 1
PRIOR ART

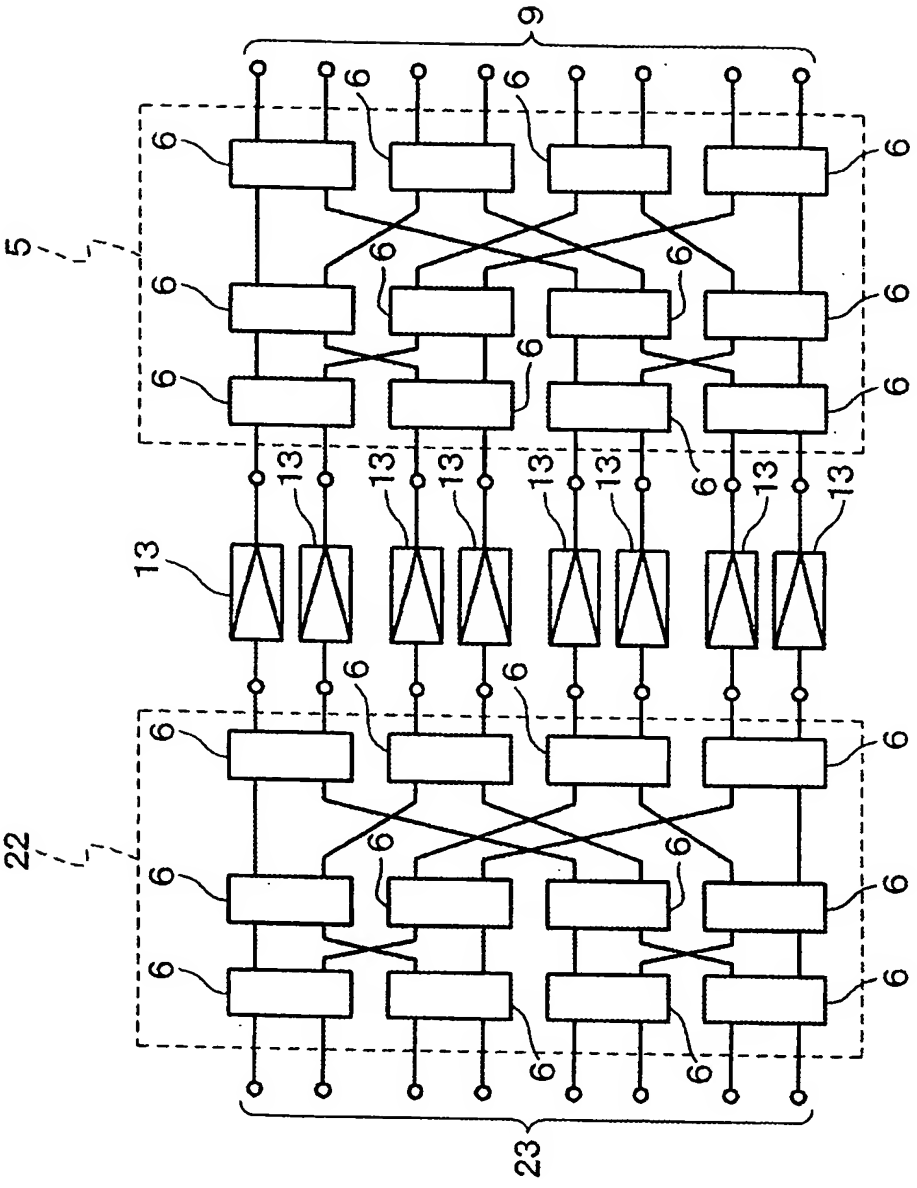
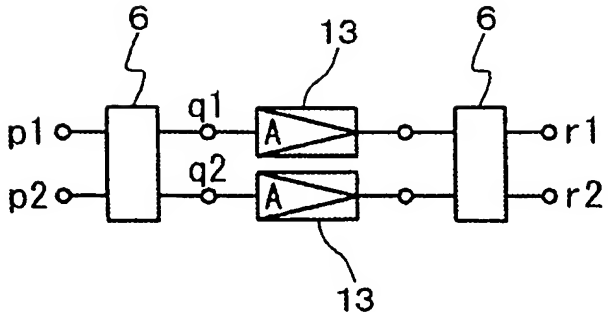


Fig. 2

PRIOR ART



$$q1 = p1 \cdot \frac{1}{\sqrt{2}} e^{j0^\circ} + p2 \cdot \frac{1}{\sqrt{2}} e^{-j90^\circ} \quad \cdots(7)$$

$$q2 = p1 \cdot \frac{1}{\sqrt{2}} e^{-j90^\circ} + p2 \cdot \frac{1}{\sqrt{2}} e^{j0^\circ} \quad \cdots(8)$$

$$e^{-j90^\circ} = \cos(-90^\circ) + j\sin(-90^\circ) = -j \quad \cdots(9)$$

$$\begin{pmatrix} r1 \\ r2 \end{pmatrix} = \frac{A}{\sqrt{2}} \begin{pmatrix} 1 & -j \\ -j & 1 \end{pmatrix} \begin{pmatrix} q1 \\ q2 \end{pmatrix}$$

$$= \frac{A}{\sqrt{2}} \cdot \frac{1}{\sqrt{2}} \underbrace{\begin{pmatrix} 1 & -j \\ -j & 1 \end{pmatrix}}_{\text{output side matrix}} \underbrace{\begin{pmatrix} 1 & -j \\ -j & 1 \end{pmatrix}}_{\text{input side matrix}} \begin{pmatrix} p1 \\ p2 \end{pmatrix} = -jA \begin{pmatrix} p2 \\ p1 \end{pmatrix} \quad \cdots(10)$$

Fig. 3

PRIOR ART

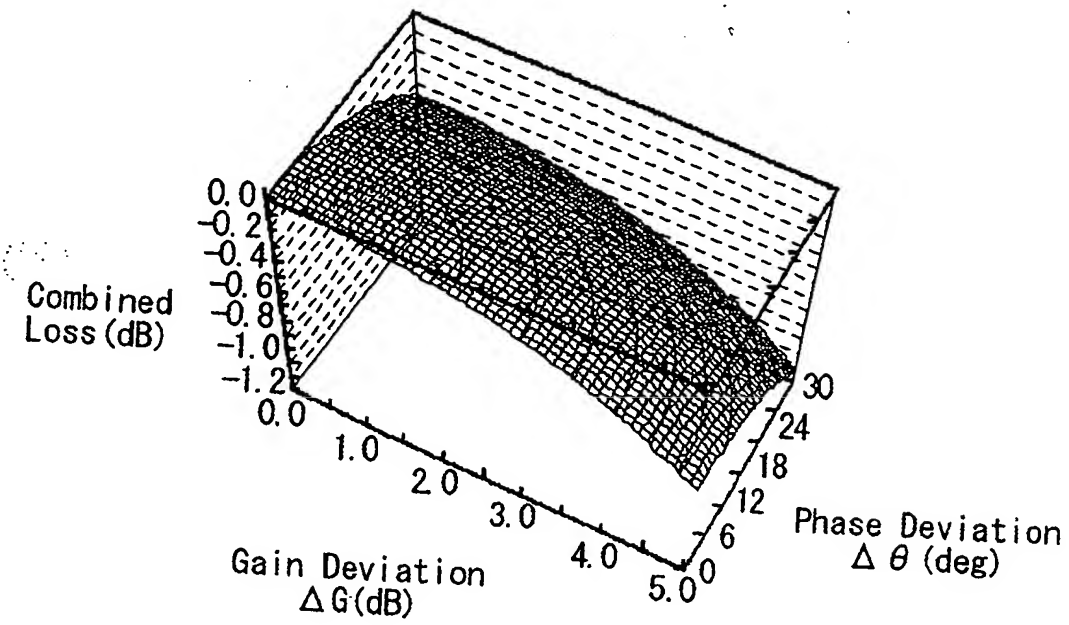


Fig. 4

PRIOR ART

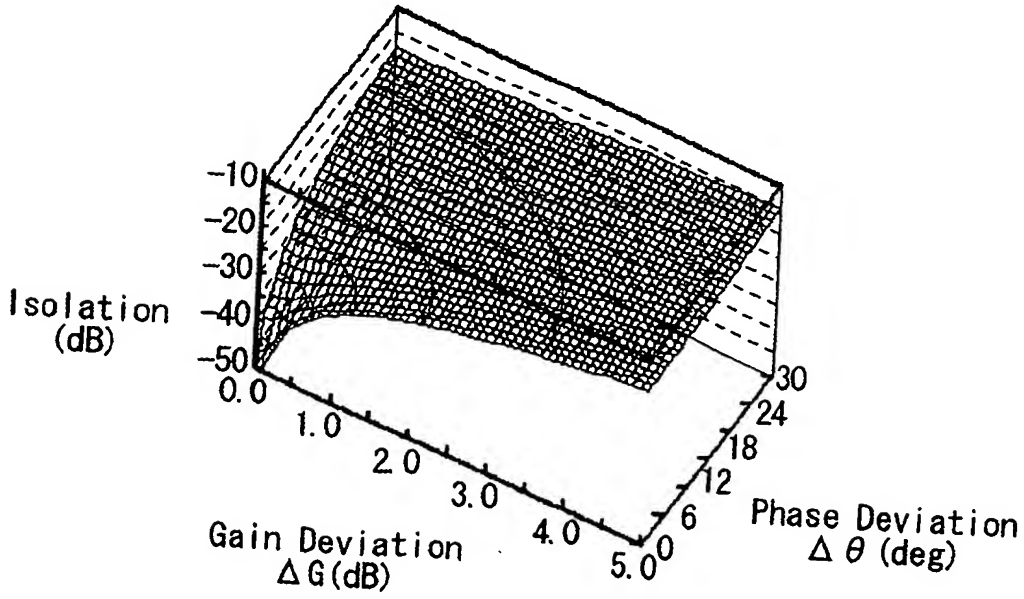


Fig. 5
PRIOR ART

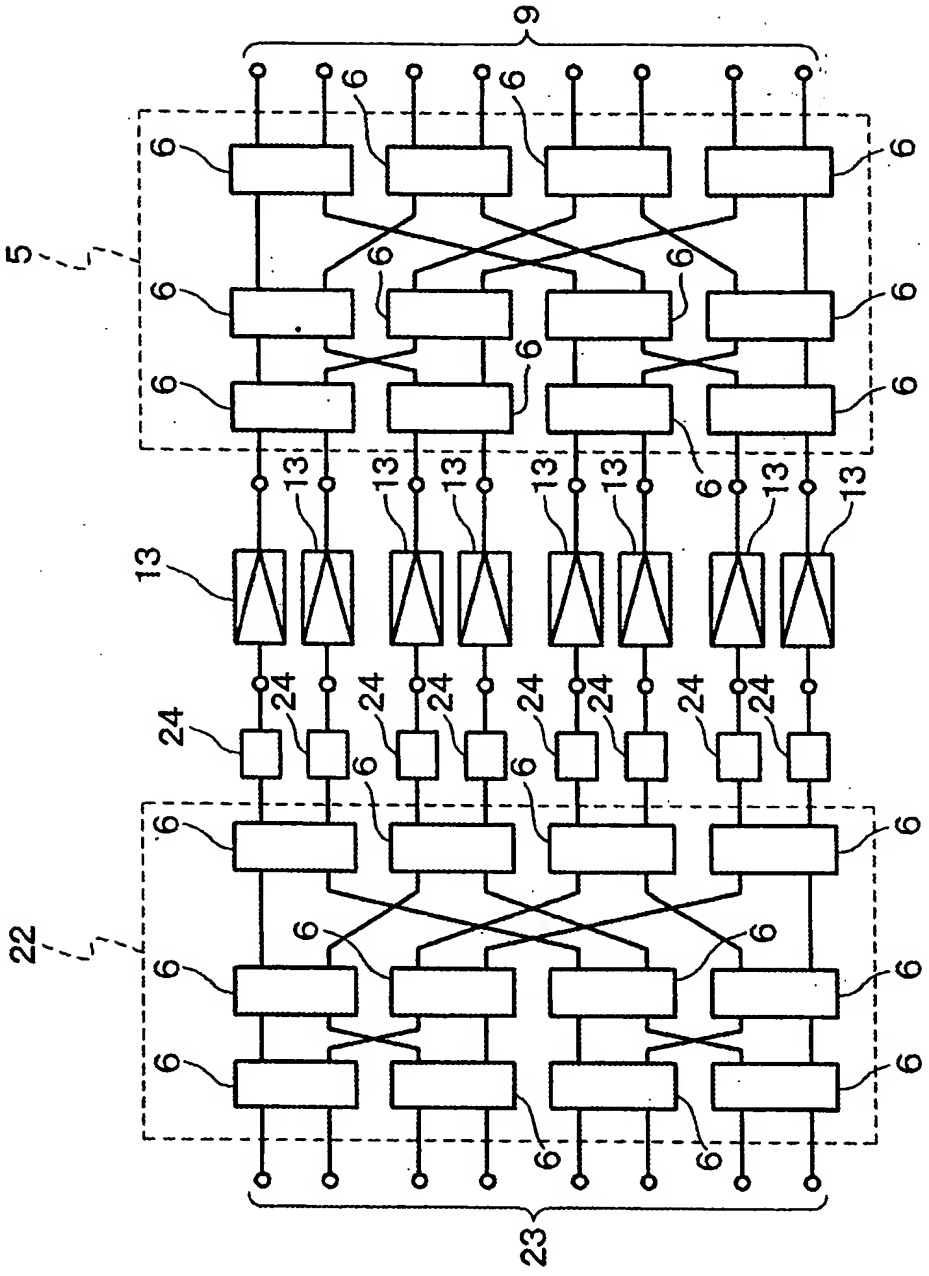


Fig. 6

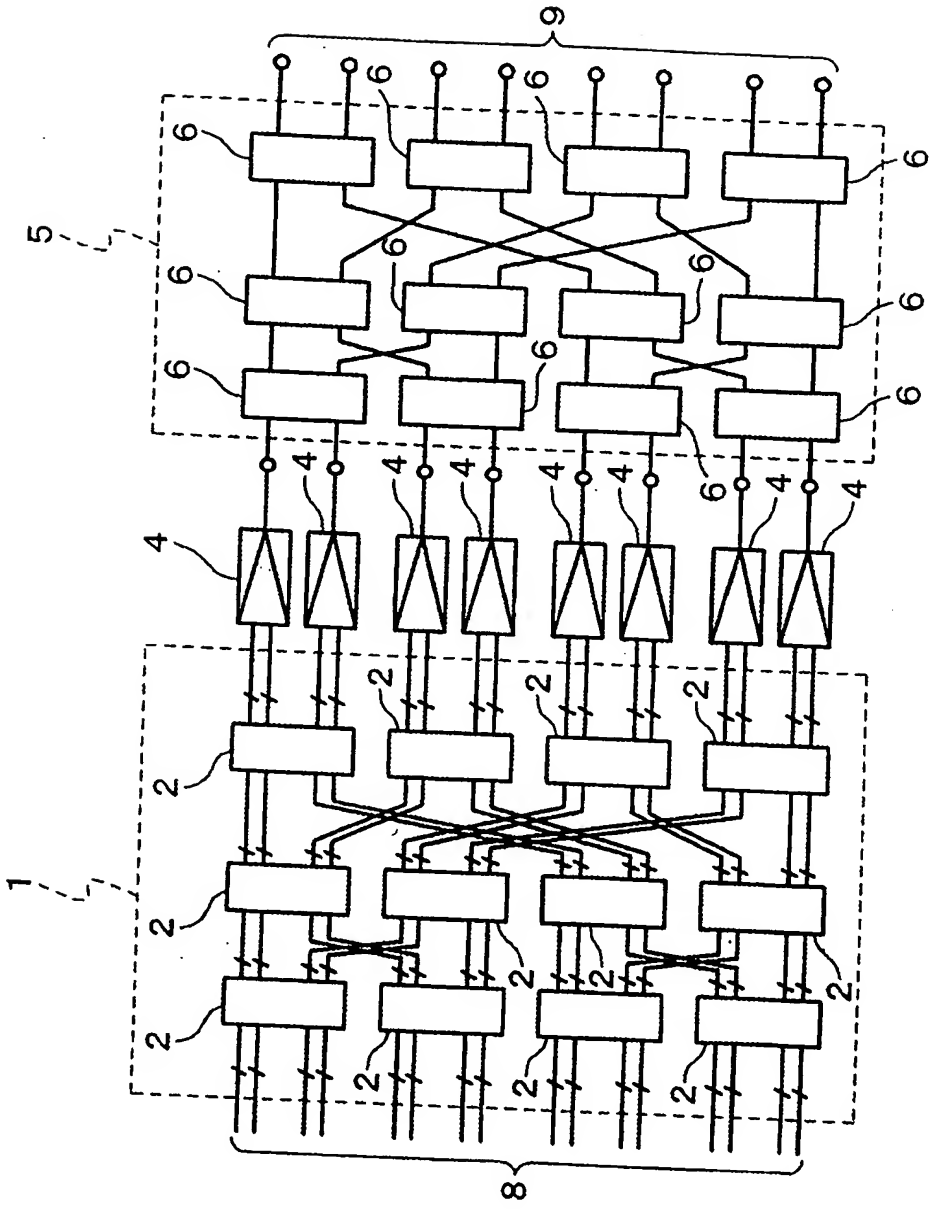
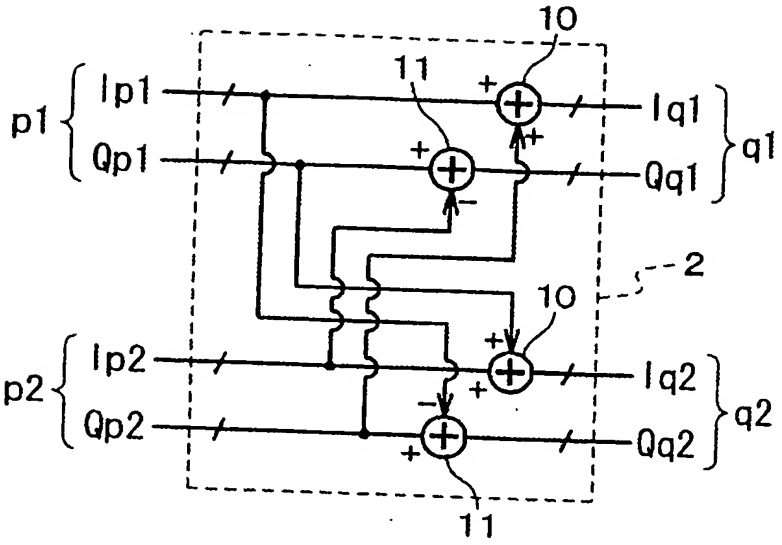


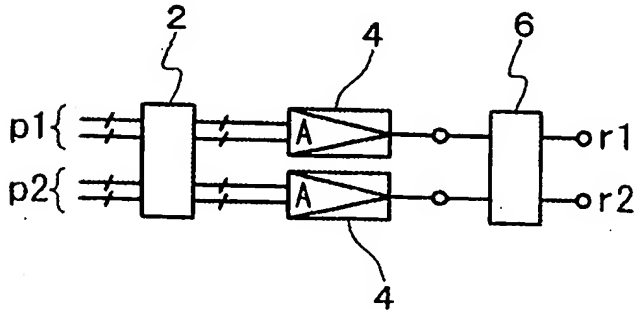
Fig. 7



$$e^{-j90^\circ} = \cos(-90^\circ) + j\sin(-90^\circ) = -j \quad \cdots(1)$$

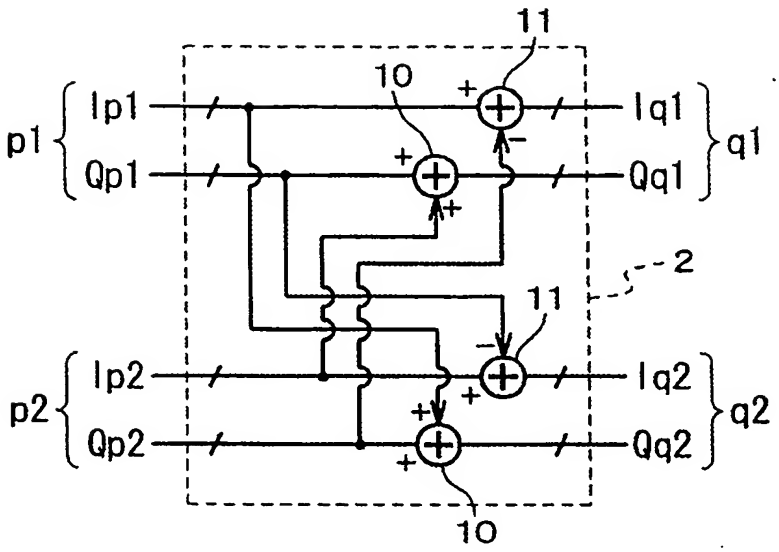
$$\begin{pmatrix} I' \\ Q' \end{pmatrix} = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}\begin{pmatrix} I \\ Q \end{pmatrix} = \begin{pmatrix} Q \\ -I \end{pmatrix} \quad \cdots(2)$$

Fig. 8



$$\begin{pmatrix} r1 \\ r2 \end{pmatrix} = \frac{A}{\sqrt{2}}\underbrace{\begin{pmatrix} 1 & -j \\ -j & 1 \end{pmatrix}}_{\text{output side matrix}}\underbrace{\begin{pmatrix} 1 & -j \\ -j & 1 \end{pmatrix}}_{\text{input side matrix}}\begin{pmatrix} p1 \\ p2 \end{pmatrix} = -jA\sqrt{2}\begin{pmatrix} p2 \\ p1 \end{pmatrix} \quad \cdots(3)$$

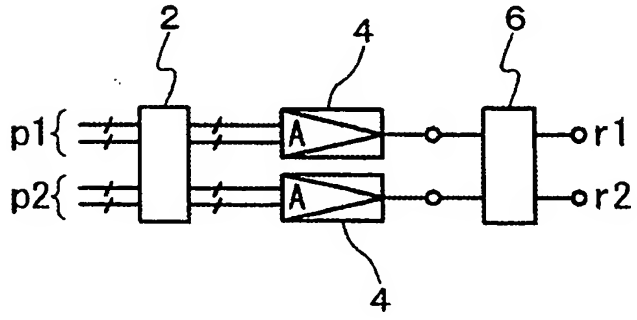
Fig. 9



$$e^{j90^\circ} = \cos(90^\circ) + j\sin(90^\circ) = j \quad \cdots(4)$$

$$\begin{pmatrix} I' \\ Q' \end{pmatrix} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} I \\ Q \end{pmatrix} = \begin{pmatrix} -Q \\ I \end{pmatrix} \quad \cdots(5)$$

Fig. 10



$$\begin{pmatrix} r1 \\ r2 \end{pmatrix} = \frac{A}{\sqrt{2}}\underbrace{\begin{pmatrix} 1 & -j \\ -j & 1 \end{pmatrix}}_{\text{output side matrix}}\underbrace{\begin{pmatrix} 1 & j \\ j & 1 \end{pmatrix}}_{\text{input side matrix}}\begin{pmatrix} p1 \\ p2 \end{pmatrix} = A\sqrt{2}\begin{pmatrix} p1 \\ p2 \end{pmatrix} \quad \cdots(6)$$

Fig. 11

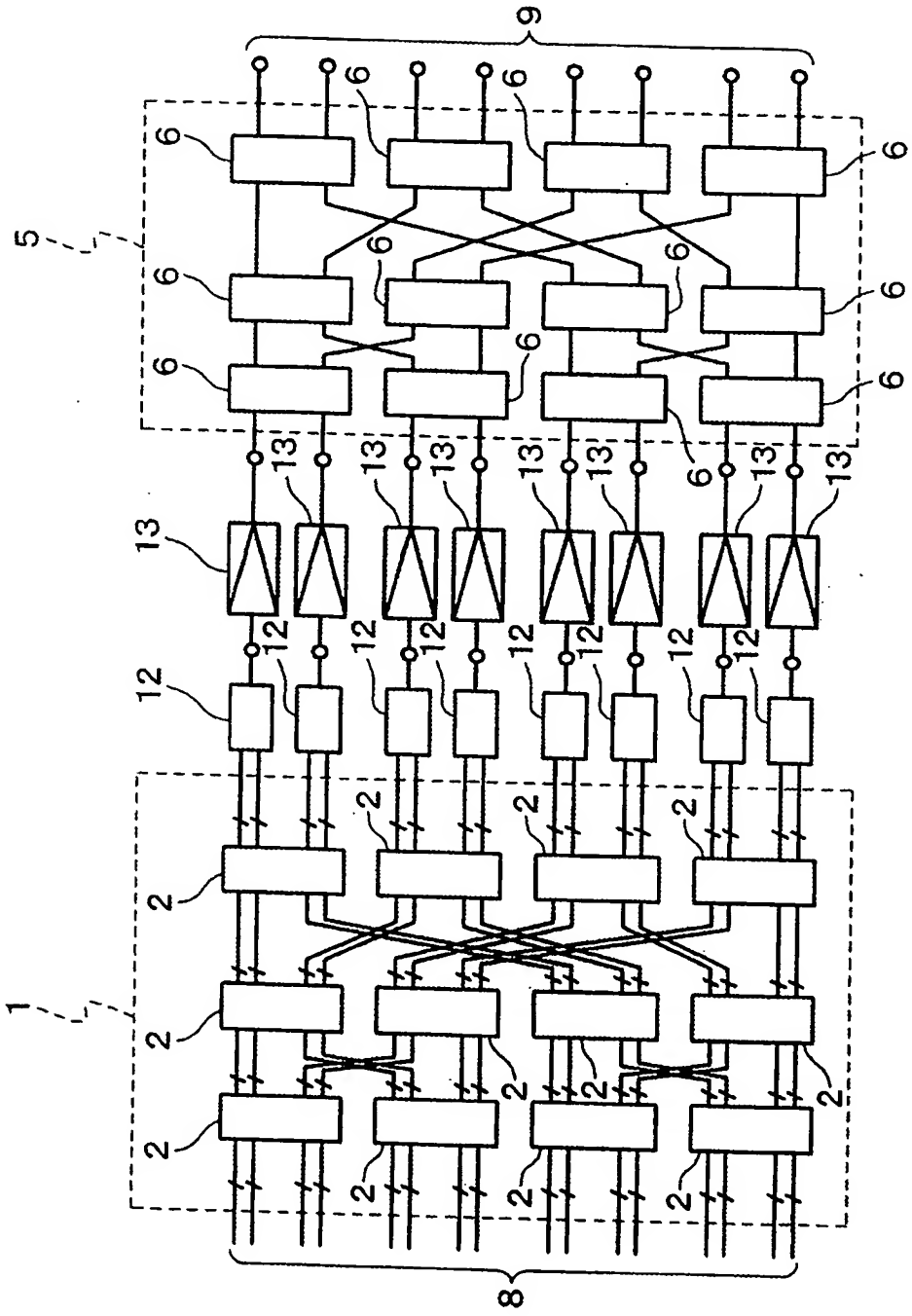


Fig. 12

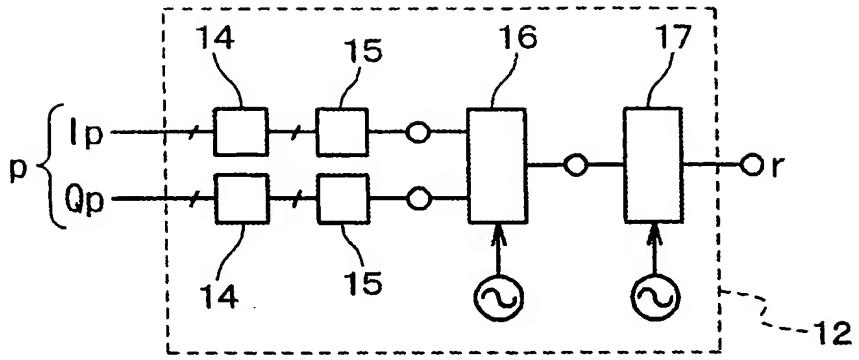


Fig. 13

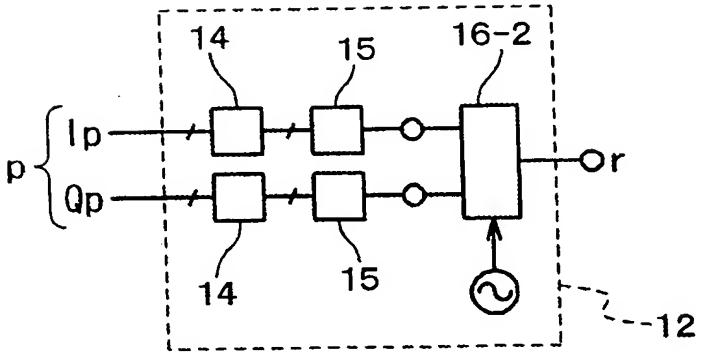


Fig. 14

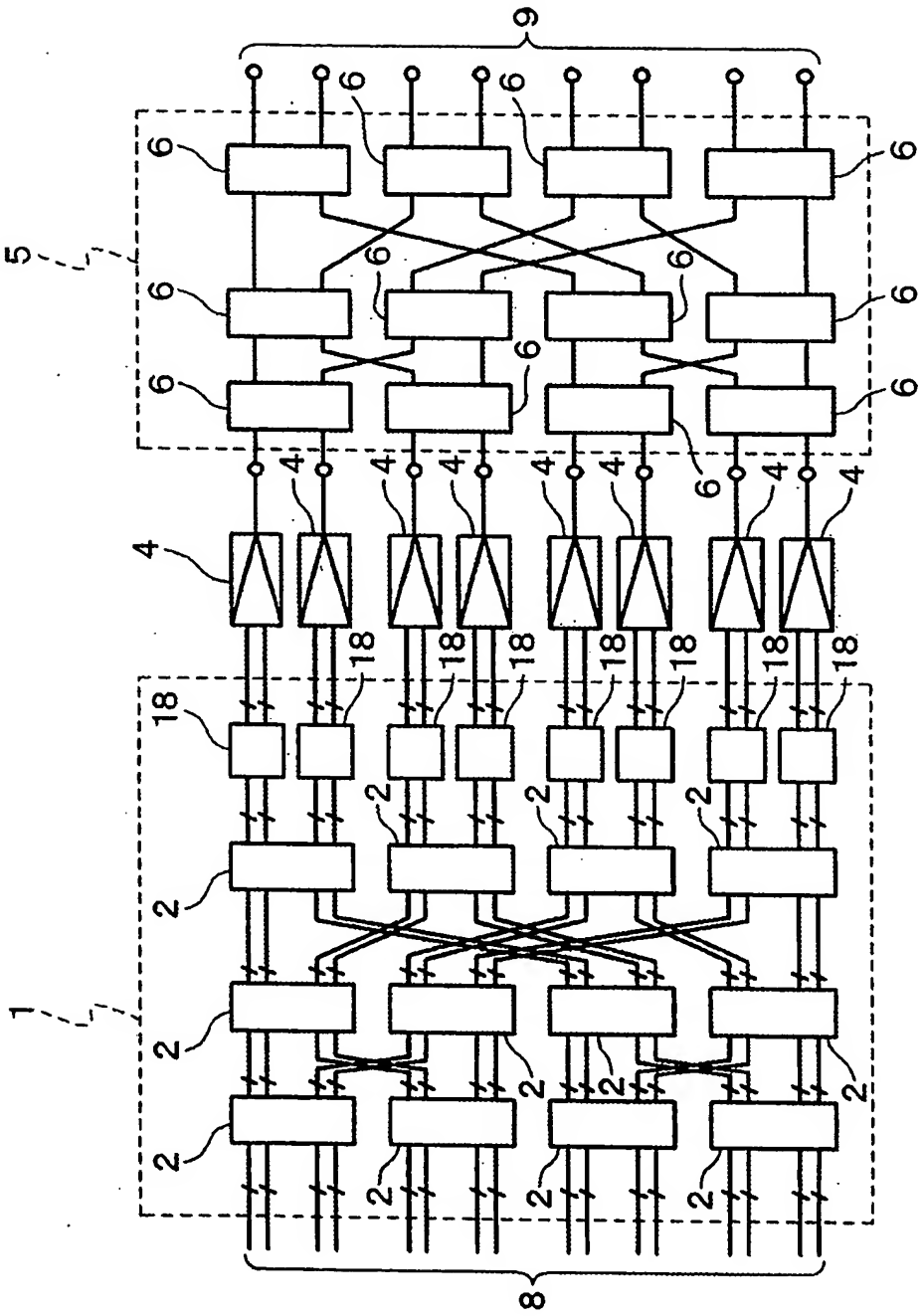


Fig. 15

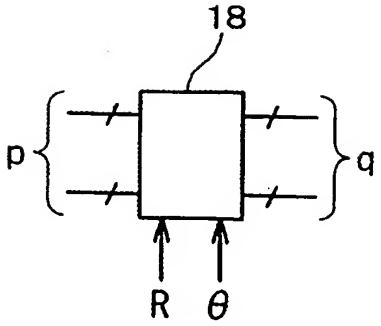


Fig. 16

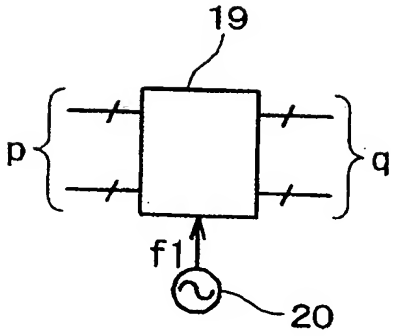


Fig. 17